User Manual

M3 Monocular HMD

(optical see-through)

Subject to technical modifications

Copyright: Trivisio Prototyping GmbH, Herzogenbuscher Str. 14, D-54292 Trier

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WARNING

Before using the M3 HMD please read carefully these safety instructions.

Read this handbook and use the M3 device in strict accordance in order to prevent any damage to your eye, other injury, loss of visual functions, property damage or death.

Children under the age of fifteen may not use this product.

We strongly advise you to get familiar with the M3 device and its capabilities before you use it for the first time.

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1 Safety Instructions

1.1 Prescribed Use

The product is designed to display video signals via a DVI port from a PC. The power is supplied via a USB port.

1.2 Health Concerns

➔ WARNING: Eye Disease, Eye Injury, and Glaucoma

If you have been diagnosed with or are susceptive to eye disease, eye injury, or glaucoma consult your doctor before use and do not use without your doctor's approval.

➔ CAUTION: Heart Disease, High Blood Pressure

If you have a history of heart disease or high blood pressure, consult your doctor before use and do not use without his approval.

➔ CAUTION: Seizures

If you have a history of temporary spasm, unconsciousness, or epileptic seizures from light stimulation, consult your doctor before use and do not use without his approval.
If any of the following symptoms occur while using the M3 HMD, stop using immediately and rest:

- eye fatigue or irritation,
- headaches or dizziness,
- aches and pain in the neck or shoulders,
- double vision,
- nausea or motion sickness,
- inability to focus on the displays.

Misuse or overuse of this product may result in eye damage, or loss of visual functions.

1.3 General Safety Hints

- ➔ Avoid getting the cable entangled around your neck, body or arms. Use the belt pouch for the power unit and wear the cable close to your body.
- ➔ To ensure that the device does not fall off during use, always use the headband, and have it tightened with an adequate tension.

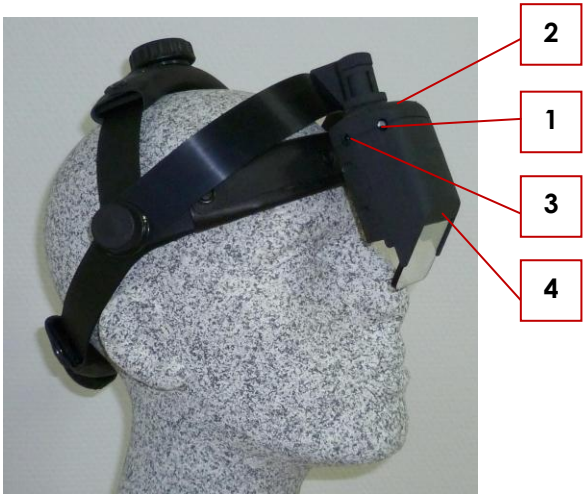
1.4 Warning for Electrical Products

- ➔ To avoid any risk of electrocution, do not bring any part of the M3 HMD in contact with water when the device is connected to an AC outlet (e.g. when plugged to PC).
- ➔ Avoid using and storing the M3 HMD at wet, humid, dusty and smoky surroundings and extreme temperatures.
- ➔ Do not use M3 HMD at temperatures below 0°C and above +40°C. Avoid dropping or mechanical shock, as frame and displays may be deformed.
- ➔ Always switch off and unplug the M3 HMD when it will not be used.
- ➔ In case of damage contact your retailer. There are no user serviceable parts. Only qualified service personnel should perform any service required on this product.

2 Description

2.1 Head Mounted Display (HMD)

The HMD contain one **micro-displays** (2) to show the image. The **cable** (1) is permanently attached to the HMD and to the dongle element. **Without a PC or external video source connected to the device there is no image visible inside the HMD!** Into the **3.5mm socket** (3) earphones can be connected. There is a built-in **microphone** (4) on the bottom side of the case.

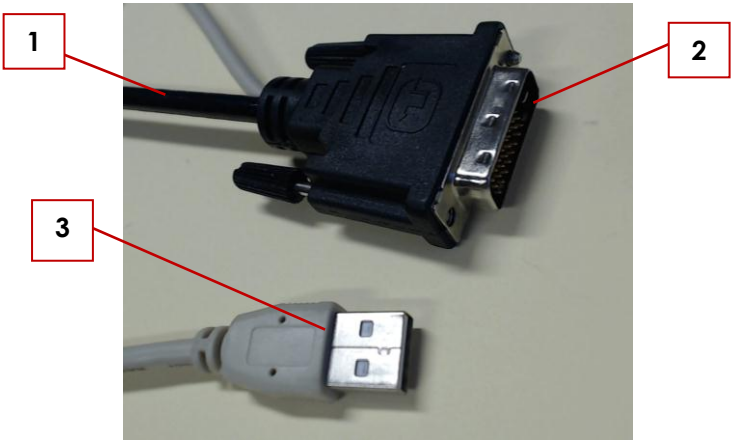


The M3 Monocular HMD is a specialized product designed for Augmented Reality applications. It is a monocular optical see-through device that projects an image or a streaming video through the near-the-eye micro-display. The frameless design allows nearly unblocked vision.

2.2 DVI Dongle

The DVI dongle contains the following elements:

(1) HMD cable permanently attached
(2) DVI connector (connect to graphics card)
(3) USB plug for power supply, audio and settings



3 General Operating Instructions

3.1 Installing Software

Please install the HMD adjusting software HMD_CONNECTION **before** you connect the device the first to time to your PC. The latest HMD software can be downloaded from the website (www.trivisio.com/support/software).

The HMD_CONNECTION software interacts with the firmware of the HMD through USB bus and allows to control parameters of the HMD, as well as to update HMD firmware. For more information read section 3.4.

3.2 Connecting HMD to external video source

To prevent damage to the electronic, first connect the video cables with your PC before you power on the device by connecting the USB cable. You can connect the device by plugging the DVI dongle directly into your graphics card (in case of HDMI output you can use converter plug) or by using DVI extender cable. The device will automatically recognize the correct signal.

A static image can burn into the microdisplay after an extended period of time! Avoid displaying a still image for a long time. To turn the device off, unplug the USB cable first and then unplug the DVI connection.

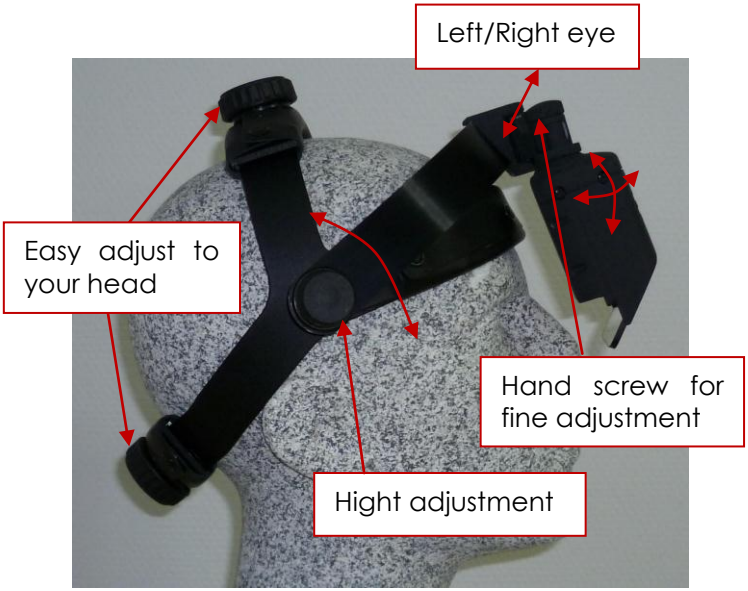
3.3 Attachment and Mechanical Adjustment

Putting on the HMD

➔ Put on the M3 HMD. Place the headband around the back of your head and pull it just tight enough to make it fit safely and comfortably.

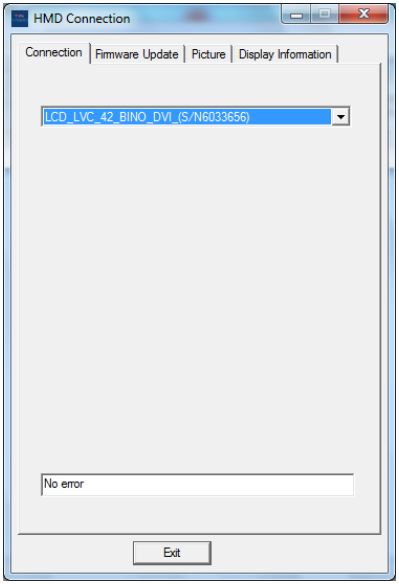
➔ On the displays inside the HMD, you can now see the pictures of your video source.

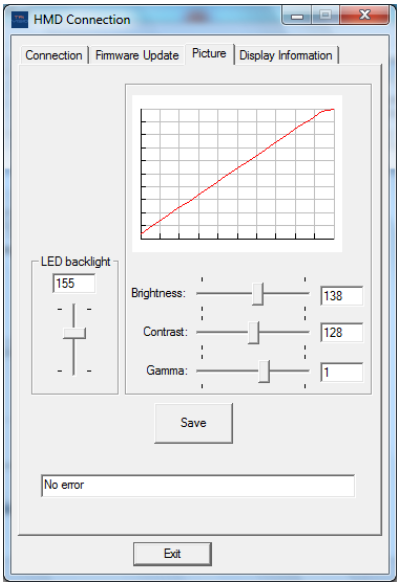
➔ Wearing the HMD you will see your surroundings only constricted. For this reason, please, move only carefully or not at all.



3.4 Adjusting the Image (by Software)

To adjust the image, start the software "hmd_connection.exe" which can be downloaded from www.trivisio.com. Please install **first** the software according to the instructions **before** you connect the HMD with the PC using the DVI and USB-cable. After installation process plug in the DVI and USB cable to the PC to turn on the device. Windows will detect the hardware and install automatically. To adjust the image, start the software "hmd_connection.exe" either from icon or start menu. Then select the HMD (also serial number is shown here). Then you can go to menu "Picture" and adjust the brightness, contrast and gamma of the image.



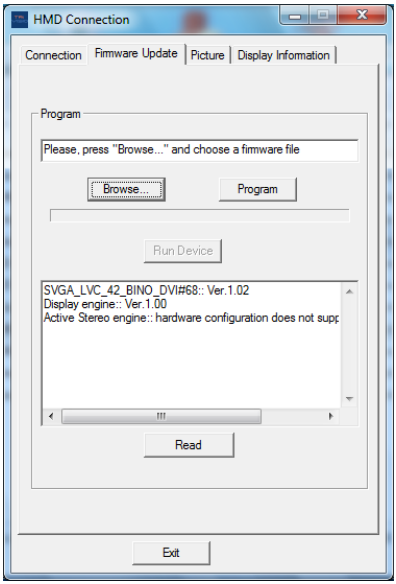


3.5 Using Audio

After connecting the USB cable to your PC, Windows will detect the built-in microphone and also the earphones as audio devices.

3.6 Firmware update

In the need of a firmware update connect the device with the USB cable to the PC and turn on the device. Then run HMD-software "hmd_connection.exe" and chose the menu of new firmware. Select the firmware file by clicking on "Browse". The firmware is provided as a .hex file. Then click "Program". After programming the file the device will turn off automatically. **During the update process never unplug the device and do not shut down the computer and do not turn off the power!** If the device fails to turn on, try to reprogram .hex file.



4 Maintenance and Cleaning Instructions

To clean the HMD use a damp cloth. A light rinsing agent may be added to the water. Do not use any detergents.

To clean the oculars of the HMD use a dry, clean cloth.

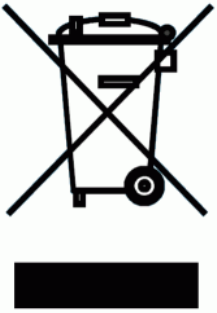
In case of damage contact your retailer. There are no user serviceable parts. Only qualified service personnel should perform any service required on this product.

5 Troubleshooting

Problem	Cause	Remedy
Only dark, or only white image	Incorrect brightness.	See HMD software and adjust correct
No image	No DVI signal applied	Connect a video source (SVGA)
No image	Wrong resolution or frequency from graphics card	Set 800x600@60Hz
No image	Appliance switched off, no power connected	Plug USB cable to PC
Unsharp image	Dirt on beamsplitter	Clean beamsplitter

All other problems should be performed by a trained and authorised service provider!

6 Returning used electronic devices in EU countries

	This HMD and accessories shall not be treated as household waste. The separate collection is a condition for reuse, recycling and utilisation of used electronic devices, which ensures the protection of resources. To comply with german ElektroG (Rucknahme und Entsorgung von Elektro- und Elektronikaltgeraten) and european WEEE (Waste Electrical and Electronic Equipment) electronic used devices from private households can be returned free of charge. For details please contact your local distributor or directly Trivisio Prototyping GmbH (www.trivisio.com).

7 Technical Data

Microdisplay	SVGA AMLCD 800x600 color (equals 1,440,000 pixels)
Display Color	24 bit
Frame Rate	60fps
See-through ratio	50%
Field of View	29° diagonal (4:3, 23° (horiz), 17° (vert))
Distortion	1.3% (horiz), 0.8% (vert), 2.1% corner
Eye Relief	25mm (edge of beamsplitter)
Eye Motion Box	6mm (horiz) x 6mm (vert)
Accommodation Distance	1580mm
Video Interface	DVI-D
Audio (via USB)	Microphone integrated, 3.5mm socket for headset
Cable Length	2.2m (optional 5m)
Power Consumption	Display 2.5W (5V, taken from USB port)
Operating Temperature	0°C to +40°C
Weight	140g (without headband)
Dimensions (W/H/D):	50mm/110mm/40mm

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